

REMARKS

This paper responds to the Office Action mailed on July 3, 2006.

Claims 1, 3, 4, 29, 67 and 68 are amended, no claims are canceled, and no claims are added; as a result, claims 1-4, 29 and 67-71 are now pending in this application.

§102 Rejection of the Claims

Claims 1-4, 29, 67 and 71 were rejected under 35 U.S.C. § 102(b) for anticipation by Zhao (U.S. 6,051,286). Applicant respectfully traverses this rejection.

The cited reference of Zhao discloses a process for a high temperature, high deposition rate deposition of titanium layers. The temperature is stated to be at least 400 deg C and preferably 625-750 degrees C (see at least the abstract; col., 1, lines 46 and 50; col. 5, lines 32 and 53; col. 6, lines 9, 41 and 50; col. 35, lines 30, 45, 53, 57 and 60). The exemplary process indicated by the Examiner notes that the pressure is from 1.0 to 10 Torr (see at least col. 6, line 42; col. 35, lines 17 and 26; col. 37, line 3; col. 38, line 38) during deposition reactions to improve the deposition rate. The process has four gases, a purge gas at about 1,000 sccm, a source gas at about 200 sccm, a reactant gas at 9,500 sccm, and a plasma gas at 5,000 sccm, which is stated to result in a source gas to reactant gas ratio of 250 to one (see col. 35, line 42 to col. 6, line 55).

Applicant respectfully submits that the cited reference fails to disclose at least the claimed features of “*...a composition of approximately 50 to 90 % of a metal-containing gas in said ion promoting atmosphere at a pressure and temperature range sufficient for film deposition of said metal at a deposition rate of about 0.60 microns per minute ...*”, as recited in independent claim 1, as amended herein. As noted above, the cited reference has a source gas to reactant gas ratio of less than one part source gas (the metal containing titanium tetrachloride) to 250 parts of the reactant hydrogen gas, and thus can not be 50 to 90% metal containing gas, not even taking into account the addition of the plasma gas and purge gases. Further the cited reference discloses less than 0.40 microns pre minute deposition rate, uses too high a temperature, and to high a vacuum chamber pressure to obtain the claimed arrangement.

Applicant respectfully submits that the cited reference fails to disclose at least the claimed features of “*...maintaining a pressure of from 1 mTorr to 1.0 Torr and a temperature of*

from 150 to 400 degrees Celsius in a combination of gases comprising at least a precursor gas, a reactant gas, and a chemically inert reactive species promoter gas which allow for PECVD metal-containing film deposition at a deposition rate of from 0.40 to 0.60 microns per minute ...”, as recited in independent claim 29, as amended herein. The cited reference of Zhao operates in a different pressure, temperature and deposition regime than the claimed arrangement.

Applicant respectfully submits that the cited reference fails to disclose at least the claimed features of “*...transporting said deposition gas mixture to a reaction chamber having a predetermined pressure of from 1 mTorr to 1.0 Torr and predetermined temperature of from 150 to 400 degrees Celsius ...*”, as recited in independent claim 67, as amended herein. The cited reference discloses different pressure and temperature ranges than the claimed arrangement.

Applicant respectfully disagrees with the statement on page 3, fourth paragraph, that Zhao teaches a temperature range of 100 – 500 °C in column 35, line 30, and notes that the indicated section discloses 400-750 °C. Applicant respectfully disagrees with the statement that Zhao teaches a pressure range of 1 mTorr – 10 Torr in column 35, line 17, and notes that the indicated section discloses 1 Torr to 10 Torr.

The dependent claims are held to be patentably distinct over Zhao at least as depending from base claims shown above to be patentable over the cited reference. In view of the above claim amendments and arguments, Applicant respectfully requests that this rejection be reconsidered and withdrawn.

§103 Rejection of the Claims

Claims 68-70 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Zhao (U.S. 6,051,286). Applicant respectfully traverses this rejection.

The cited reference of Zhao has been discussed above. Applicant respectfully submits that the cited reference, whether taken alone or in any combination with other well known references, fails to describe or suggest at least the claimed features of “*...transporting said deposition gas mixture to a reaction chamber having a predetermined pressure of from 1 mTorr to 1.0 Torr and predetermined temperature of from 150 to 400 degrees Celsius ...*”, as recited in independent claim 67, as amended herein and from which claims 68-70 depend. The cited

reference discloses different pressure and temperature ranges than the claimed arrangement, and does not describe or suggest that the lower temperature and pressure ranges may result in higher deposition rates due to the reaction promotion of an inert material. Since the cited reference does not suggest the use of lower temperature for high deposition rate reactions, as discussed in the present specification at least at paragraphs [0028] to [0036].

The dependent claims are held to be patentable over the cited reference at least as depending from a patentable base claim. In view of the above, Applicant respectfully requests that this rejection be reconsidered and withdrawn.

Double Patenting Rejection

Claims 67-71 were rejected under the judicially created doctrine of obviousness-type double patenting over claims 3 and 15 of U.S. Patent No. 6,291,341. Applicant respectfully disagrees, and submits that claim 67 differs from claim 3 of U.S. Patent No. 6,291,341 at least in claim 67 reciting that “*...the deposition gas mixture having a precursor to reactant chemical reaction potential, and a chemically inert reaction promoter mixed with said deposition gas ...*”, while claim 3 of U.S. Patent No. 6,291,341 only has a precursor gas and a chemically inert gas. Thus there is no *precursor to reactant chemical reaction potential* since the inert gas has no reaction potential. Claim 15 of U.S. Patent No. 6,291,341 fails to suggest the “*...a reaction chamber having a predetermined pressure of from 1 mTorr to 1.0 Torr and predetermined temperature of from 150 to 400 degrees Celsius ...*”, and recites that the pressure is 5 Torr, and no temperature is suggested in the dependent claims. Thus, the claims 67-71 are held to be non-obvious over claims 3 and 15 of U.S. Patent No. 6,291,341.

Claims 1-4 and 29 were rejected under the judicially created doctrine of obviousness-type double patenting over claims 1, 11 and 15 of U.S. Patent No. 6,291,341 in view of Zhao (U.S. 6,051,286). Applicant respectfully disagrees, and submits that claim 1 differs from claim 1 of U.S. Patent No. 6,291,341 at least in reciting “*... a plasma formed in the ion promoting atmosphere, having a composition of approximately 50 to 90 % of a metal-containing gas...*”, while the claims 1, 11 and 15 of the reference do not suggest this composition. Thus, claims 1-4 and 29 are held to be non-obvious over claims 1, 11 and 15 of U.S. Patent No. 6,291,341.

Applicant does not admit that the claims are obvious in view of U.S. Patent No. 6,291,341 at least due to the reasons given above. However, a Terminal Disclaimer in compliance with 37 C.F.R. 1.321(b)(iv) will be considered to obviate these rejections upon indication that the claims are otherwise allowable.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney David Suhl at (508) 865-8211, or the undersigned attorney at (612) 349-9587 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,
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Date

3 Oct '06

By

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Mail Stop Amendment, Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 3 day of October 2006.

Name

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Late. G